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ORIGINAL RESEARCH

Nutritional labeling of processed foods (nutritional stoplight) and its relationship with socioeconomic, cultural, demographic and advertising factors, according to parents of children between 5-11 years of age from two schools in Quito

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Abstract

Introduction: Nutrition labeling is a graphic tool to notify consumers about the nutritional properties of a food, which facilitates their selection. The objective of this study was to determine the influence of nutritional labeling and socioeconomic, cultural, demographic, and advertising factors on food selection in a group of parents of children between 5-11 years old in two public and private educational units in Quito.

Methods: With a mixed, quantitative-transversal and qualitative interpretative design, a sample of opinions of 240 parents in the Educational Units (UE) Nueva Aurora (Fiscal) and 235 parents in the UE Julio María Matovelle (Private) of Quito was analyzed. Three focus groups were carried out, recorded and transcribed textually, and a questionnaire was administered. The statistical package used was SPSS v24.0.

Results: There was a higher consumption of processed foods in the private EU n = 79/240 (32.9%). Selection for easy preparation (39.2% Private EU and 46.4% Public EU). 54.2% and 57% of parents see advertising on television. Knowledge of labeling was higher in the private EU (94.9%; n = 223). Association between age [OR: 2.3; 95% CI: 1.08-5.04] instruction [OR: 3.95; 95% CI: 2.12-7.37], exposure to advertising [OR: 0.62; 95% CI: 0.36-1.05] and knowledge (P <0.05). Attitude was associated with educational level [OR: 2.57; 95% CI: 1.62-4.09] and admissions (P <0.05). Qualitative analysis: high degree of knowledge and publicity, with a significant impact on food selection.

Conclusions: Knowledge about nutritional labeling was high, but it was not the main factor in selecting food. Prep time and flavor were more important than nutritional specifications.

Keywords:

MESH: /diet therapy; Diet, Food, and Nutrition; Child Nutrition Sciences; Food and Nutrition Education; Nutritive Value; Food Publicity.

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Introduction

The World Health Organization (WHO) in 2004, at the 57th World Assembly, adopted the "Strategy on diet, physical activity and health", which is aimed at reducing consumption in excess of certain foods and lack of physical exercise, risk factors related to the development of chronic noncommunicable diseases [1].

The United Kingdom was the first country to incorporate and propose the use of this tool in the form of nutritional stoplight (NS) through the "UK Coronary Prevention Program" in 1990, but it was implemented in 2006 by the Food Standards Agency (FSA) of the United Kingdom. The United States was created as a strategy for the food industry to help consumers understand nutritional information and thus make better decisions when buying food. In Latin America, Ecuador, Chile and Mexico implemented regulatory measures for processed foods (PF) in the form of nutritional labels as the basis of a public health strategy [2].

The Ecuadorian Ministry of Public Health, through Ministerial Agreement 4522 published in Official Registry Supplement No. 134 of November 29, 2013, issued the "Sanitary Regulation for the Labeling of Processed Foods for Human Consumption", with official regulation by the National Agency for Health Regulation, Control and Surveillance (ARCSA), which incorporated food labeling in the form of a semaphore, to promote understanding by the population and help in the fight against obesity [3].

In Ecuador, NS has been taken as a reference because it is easy to understand and interpret, surpassing the barriers of educational knowledge, thus allowing the entire population to have basic knowledge of the nutritional components and to make an adequate nutritional decision at the time of acquiring PF; currently, NS is used in England, Germany, Ecuador, Chile and Mexico [2].

Nutritional food labeling is a graphic tool whose description is intended to inform the consumer about the nutritional properties of a food [4], whose objective is to allow the consumer to identify healthy foods, in addition to facilitating and contributing to making the best decision when selecting foods to prevent overweight and obesity [5, 6].

According to the Consumer Insight 2014 survey, carried out in Quito and Guayaquil by the consulting firm Kantar World Panel, in which consumers were consulted about their attitude towards NS, 31% of the population observes the labeling to buy healthy food, 43% are indifferent and 26% look at the label, analyze it, but end up buying the same product [7].

These results show that there are other elements that affect the selection of food by the population, such as cultural diversity, socioeconomic level and level of education. In addition, the decision to buy PF is based on the influence of advertising, taste and cost of the products. Another drawback in relation to the use of NS is that in Ecuador, it has not been widely disseminated, which is why a large part of the population does not use it when acquiring PF or does not know how to interpret it. [1, 7].

The NS is simple because through three colored bars it is possible to know if a processed food is high, medium or low in sugar, fat and salt, but at the same time it could be a drawback, since it shows a very general vision about the nutritional information of foods and can transmit confusion in the consumer who could stop ingesting certain foods that are nutritious because they are high in fat, for example, whole milk that is high in fat versus a diet drink that has no fat no sugar considered light [7, 8].

On the other hand, the child learns their eating habits from the example given by their parents or the people who are in their care; if they do not choose foods considering the energy value and nutritional information, they contribute to an unhealthy diet and increased risk of overweight and obesity. In the present research, caregivers of children between 5 and 11 years old were selected because in Ecuador, they represent the pediatric population with the highest prevalence of overweight and obesity and because children who are obese generally continue to be obese when they are adults, with a greater probability of suffering from chronic noncommunicable diseases.

Consequently, with the objective of determining the influence of the nutritional labeling of PF and the socioeconomic, cultural, demographic, advertising factors in the selection of foods by parents and/or caregivers of children between 5-11 years old in public educational units and private companies in the city of Quito.

Population and methods

Study design

The design is a mixed study. The quantitative part is cross-sectional, and the qualitative part is interpretive.

Stage

The study was carried out in the Educational Units (EU) "Nueva Aurora" located in the Guamaní parish of the Quito canton, Fiscal (Public) school of 2,616 students and in the Private EU "Julio María Matovelle" of the Metropolitan District of Quito. The study period was established between September 1, 2019, and December 31, 2019.

Participants

The participants were parents and/or caregivers of students between 5 and 11 years of age enrolled in the 2019-2020 period who voluntarily agreed to participate with informed consent. Two groups were established: parents of fiscal EUs and parents of particular EUs. Incomplete records were excluded.

Variables

The variables were descriptive sociodemographic: age, ethnicity, educational level, occupation, family income, frequency of consumption of processed products, frequency with which you see or hear advertising about PF, advertising strategies, advertising persuasion, advertising media, selection of PF, knowledge about NS, attitude about NS, and practices related to the use of NS.

Data sources

The information was obtained through a structured survey administered to parents and/or caregivers.

Control of sources of bias.

Records whose data were not complete were excluded, and the imputation of lost or excluded data was avoided. A double check of the data was carried out by independent sources.

Study size

The sampling was probabilistic with calculation of the sample size for a descriptive study from a finite population. In the Fiscal-EU, the universe was 820 students, and in the Private-EU, it was 757 students. The sampling method was stratified. The following strata were considered: High school, 5-year-old students; basic elementary: students between 6 and 8 years old; and middle school: students between 9 and 11 years old (table 1).

Table 1 Universe and sample of educational units

Sublevels	Fiscal-EU N=820			UE-Private-EU N=757		
	Sub-population	Sample n=240		Subpopulation	Sample n=235	
I	92	27	11.2%	81	25	10.7%
II	299	88	36.5%	338	105	44.6%
III	429	125	52.3%	338	105	44.6%

EU: Educational Unit I: Preparatory, II: Elemental basic, III: Middle basic

Each child was assigned a number according to the lists provided, and finally, the study subjects from each stratum were selected in a simple random way with the online program "AZAR" (Augeweb, Almeria, Spain).

Management of quantitative variables

Nominal quantitative variables are presented as frequencies and percentages. The scale variables are presented as the means, medians, modes and standard deviations.

Statistical Methods

Quantitative method

Univariate analysis: The proportions are compared with Chi^2, and the averages are compared with Student's t, comparing the groups of Fiscal-EU vs Private-EU in the first part of the study. In the bivariate analysis, 3 dependent variables were proposed to obtain odds ratios: knowledge, attitudes and practices towards NS. Due to the nonparametric distribution in this part, the medians were compared with Man Witney's U. The independent variables were all sociodemographic and nutritional variables, and the statistical package used was SPSS 24.0 (IBM, Armonk, NY: IBM Corp).

Qualitative method

Three focus groups were carried out to capture the way of thinking, feeling and the daily life of the parents and/or caregivers of the educational units of study compared to the selection of food in their homes. For this, a guide was applied to semistructured group interviews.

Results

Participants

A total of 475 parents of families or guardians were included in the study. Each parent or guardian represents an independent student. A total of 240 parents were formed in the Fiscal-EU, and 235 were formed in the Private-EU.

Characteristics of the studied population

The average age was the same between the groups, 35.75 ± 8.58 years in the parents of the Fiscal-EU and 36.06 ± 7.33 years in the Private-EU (*P*= 0.673). The most prevalent ethnic self-identification in the Private-EU was hispanic (table 2). There was a higher percentage of parents with higher and secondary education in the Private-EU group. There was a higher percentage of parents with paid work in the EU-Private group. The economic income in the Fiscal-EU group was 470.9 ± 277 USD and that in the Private-EU group was 1040.1 ± 579 USD (*P*<0.0001).

Table 2 Demographic and socioeconomic characteristics of parents and/or caregivers

Category	Fiscal-EU n=240	Private-EU n=235	*P*
Age			
Young	59 (24.5%)	52 (22.1%)	
Adult	177 (73.8%)	182 (77.5%)	0.527
Elderly	4 (1.7%)	1 (0.14%)	
Ethnicity			
Hispanic	209 (87%)	226 (96.2%)	<0.0001
White	4 (1.7%)	3 (1.3%)	0.7251
Afro-ecuatorian	2 (0.8%)	4 (1.7%)	0.4065
Montubio	4 (1.7%)	1 (0.4%)	0.2194
Indigenous	21 (8.8%)	1 (0.4%)	0.0025
Instruction			
Illiterate	55 (22.9%)	0 (0%)	0.0005
Primary	150 (62.5%)	40 (17%)	<0.0001
Secundary	18 (7.5%)	67 (28.5%)	<0.0001
Higher	17 (7.1%)	128 (54.4%)	<0.0001
Remunerated job			
With job	111 (46.3%)	188 (80%)	<0.0001
Child caregiver			
Fathers	224 (93.3%)	229 (97.4%)	0.0398
Other relatives	16 (6.7%)	6 (2.6%)	

Consumption of processed foods (PF)

Almost all of the respondents used PF, 237 (98.8%) in the Fiscal-EU group and 234 (99.6%) in the private EU group (*P*> 0.5). The frequency of consumption was different in the 2 groups. The most frequent purchase criterion was nutritional information (NS), which was higher (54.5%) in the private EU. The most widely used means of communication for the dissemination of advertising about PF was television, and it was found that 54.2% and 57% of parents and/or caregivers always see or hear this type of advertising, respectively. In addition, the majority stated that this drives the increase in PF sales, and these results were similar in the two educational units. See table 3.

Table 3 Advertising and consumption of processed products

	Fiscal-EU n=240	Private-EU n=235	*P*
PF consumption frequency			
Always	79 (32.9%)	46(19.6%)	0.0011
Occasionally	81 (33.8%)	131 (55.7%)	<0.0001
Rarely	80 (33.3%)	58 (24.7%)	0.0384
Criteria when buying PF			
By NS	85 (35.4%)	128 (54.5%)	<0.0001
By price	58 (24.2%)	30 (12.8%)	0.0016
By brand	56 (23.3%)	46 (19.6%)	0.3190
By flavor	30 (12.5%)	29 (12.3%)	0.9580
for advertising	11 (4.6%)	2 (0.9%)	0.0261
Criteria for the consumption of PF			
Easy cooking	94 (39.2%)	109 (46.4%)	0.1123
Lack of time	56 (23.3%)	75 (31.9%)	0.0370
Taste	37 (15.4%)	21 (8.9%)	0.0329
Cost	20 (8.3%)	7 (3.0%)	0.0157
Others	33 (13.8%)	23 (9.8%)	0.1824
Advertising media			
Tv	156 (65%)	141 (60 %)	0.2606
Social network	33 (13.7%)	60 (25.5%)	0.0014
Hoarding	28 (11.7%)	21 (8.9%)	0.3293
Radio	10 (4.2%)	5 (2.1%)	0.2122
Posters/Flyers	12 (5%)	4 (1.7%)	0.0573
Newspaper	1 (0.4%)	4 (1.7%)	0.2055
See or hear advertising about PF			
Always	130 (54.2%)	134 (57.0%)	0.5314
Occasionally	41 (17.1%)	64 (27.2%)	0.0081
Rarely	69 (28.7%)	37 (15.7%)	0.0008
Advertising strategies increase sales			
Always	202 (84.2%)	216 (91.9%)	0.0106
Occasionally	18 (7.5%)	17 (7.2%)	0.9117
Rarely	20 (8.3%)	2 (0.9%)	0.0016
Advertising persuasion to buy PF			
Strongly agree	193 (80.4%)	208 (88.5%)	0.0161
Neutral	24 (10.0%)	18 (7.7%)	0.3703
Disagreement	23 (9.6%)	9 (3.8%)	0.0155

NS: Nutritional Stoplight, PF: Processed foods

Knowledge, attitudes and practices about NS

Parents and/or caregivers demonstrated a higher level of understanding about NS, with 94.9% (n = 223)

in the Private-EU group in relation to 71.3% (n = 171) of the Fiscal-EU group. It was observed that this last unit, 22.5% (n = 54), had a low level of understanding of the nutritional labeling of foods. Furthermore, the first component of the NS identified by the participants in the educational units was sugar. Regarding the reading and use of PF labeling, in public and private schools, parents and/or caregivers admitted to always read the NS in 48.8% and 75.3%, respectively, and to use it during their purchases in 45.8% and 73.6%. The main reasons for the use of the traffic light were to improve health and food habits or preferences. See table 4.

Relationship between demographic, socioeconomic and advertising characteristics and knowledge of NS

A relationship was found between the age of the parents and knowledge of NS; that is, adults had a greater risk of having low knowledge than young people (OR: 2.34), and this association was statistically significant (P= 0.027). People who have a lower level of education have a significantly greater risk of presenting low knowledge of NS (OR 3.95) (P<0.001). Ethnicity, occupation, relationship with the child and frequency with seeing or hearing advertising were not risk factors for low knowledge (P<0.05).

The average monthly income was lower in parents and/or caregivers with low knowledge of NS (549.8) than in those with high knowledge of NS (784.1) (P<0.01). Advertising strategies are a factor associated with knowledge of nutritional labeling. See table 5.

Relationship between demographic, socioeconomic and advertising characteristics and attitude towards NS

It was observed that parents and/or caregivers with a low level of education had a higher risk of choosing a product with high sugar, fat or salt content (OR: 2.57; 95% CI: 1.62-4.09), with a statistically significant association (P<001).

The average monthly family income was lower in parents and/or caregivers who chose processed products (589.33 USD), compared to the higher average income (798.24 USD) in those who rejected this type of product, and these differences were significant (P<0.01). See table 6.

Relationship between demographic, socioeconomic and advertising characteristics and NS practice

Parents and/or caregivers with a secondary or higher level of education constituted a protective factor for the use of food labeling (OR: 0.43; 95% CI: 0.29-0.63) with a statistically significant association (P<0.01). The average monthly income was higher in parents and/or caregivers who used NS (830.60 USD), in contrast to a lower average income (638.38 USD) in those who did not use the labeling before the purchase of PF, and these differences were statistically significant (P<0.01). See table 7.

Table 4 Knowledge, attitudes and practices about NS

	Fiscal-EU n=240	Private-EU n=235	*P*
Knowledge of the NS	210 (87.5%)	227 (96.6%)	0.0006
Degree of understanding			
High	171 (71.3%)	223 (94.9%)	<0.0001
Medium	15 (6.2%)	2 (0.8%)	0.0069
Low	54 (22.5%)	10 (4.3%)	<0.0001
Components of the Nutritional Stoplight			
Sugar	138 (57.5%)	157 (66.8%)	0.0369
Fat	91 (37.9%)	73 (31.1%)	0.1167
Salt	11 (4.6%)	5 (2.1%)	0.1475
Nutritional stoplight reading			
Always	117 (48.8%)	177 (75.3%)	<0.0001
Occasionally	52 (21.7%)	47 (20.04%)	0.6549
Rarely	71 (29.5%)	11 (4.66%)	<0.0001
Use of the NS			
Always	109 (45.4%)	173 (73.6%)	<0.0001
Occasionally	62 (25.8%)	48 (20.4%)	0.1632
Rarely	69 (28.7%)	14 (6.0%)	<0.0001
Reasons for the use of NS			
To improve health	153 (63.7%)	134 (57.0%)	0.1342
For sickness	20 (8.3%)	12 (5.1%)	0.1646
By habits or preferences	51 (21.3%)	77 (32.8%)	0.0049
Others	16 (6.7%)	12 (5.1%)	0.4716
Behavior against PF with high content of sugar, fat and salt			
Choose the PF	73 (30.4%)	31 (13.2%)	<0.0001
Reject the PF	167 (69.6%)	204 (86.8%)	
Relationship between the consumption of foods high in sugar, fat and salt and health problems			
In agreement	226 (94.2%)	231 (98.3%)	0.0265
Neutral	6 (2.5%)	2 (0.9%)	0.1829
Desacuerdo	8 (3.3%)	2 (0.9%)	0.0806

PF: Processed food. NS: Nutritional Stoplight

Table 5 Relationship between demographic, socioeconomic and advertising characteristics and knowledge of NS

	NS Knowledge Low n=64	High n=411	OR	CI95%	*P*
LOI (low vs High)	50 (78.12%)	195 (47.44%)	3.95	2.12-7.37	<0.001
Age (Adult vs young)	8 (12.5%)	103 (25.06%)	2.34	1.08-5.04	0.03
Advertising increases sales (Always vs Occasional)	47 (73.43%)	371 (90.26%)	0.29	0.15-0.56	<0.001

NS: Nutritional stoplight. OR: Odds Ratio, CI: Confidence Interval. LOI: Level of instruction.

Table 6 Relationship between demographic, socioeconomic and advertising characteristics and attitude towards NS

	Attitude towards the product Choose n=104	Denies n=371	OR	CI95%	*P*
LOI	72 (69.23%)	173 (46.63%)	2.57	1.62-4.09	<0.001

LOI: Level of Instruction (Low vs Secondary or Higher)

Qualitative analysis

Three focus groups were held for each educational unit, one for each level of education: preparatory, basic elementary and basic middle.

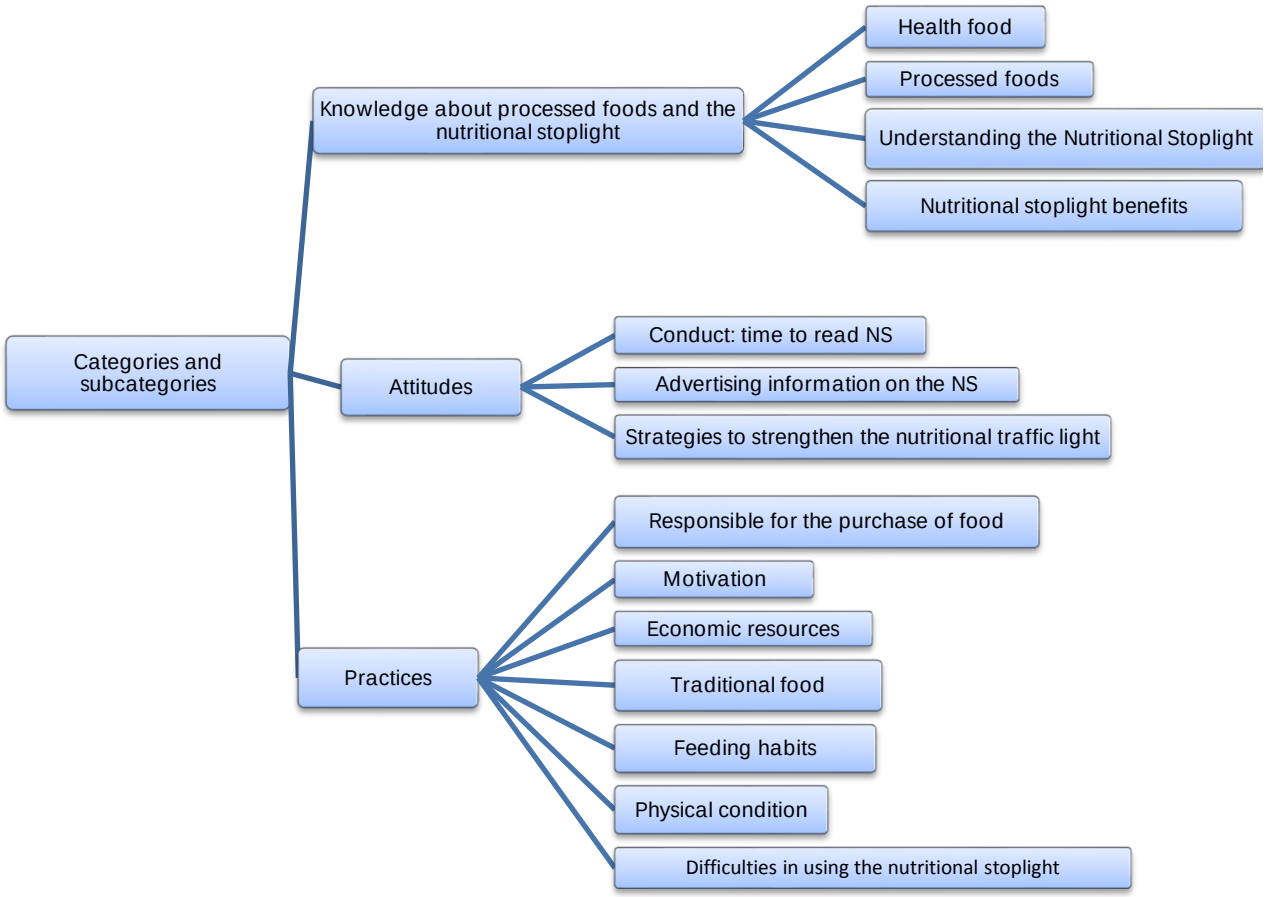

Fig. 1 Focus group categories and subcategories

The participants in the focus groups were men and women aged 20 to 75 years, and each group consisted of 7 to 8 people. See Figure 1.

Knowledge about NS

Parents stated that a healthy diet consists of consuming natural, varied and balanced foods that provide benefits for body and school performance; defined processed food as an industrialized food with additives, preservatives and colorants to improve flavor and extend the duration of the food; and mentioned that the most consumed products were canned and sausages.

Additionally, it was stated that the labeling of processed products is useful and a benchmark because it allows better food choices, although some acknowledged not using it before buying said products. In the Private EU, they stated that the information provided by the traffic light is not real, and they indicated that PF labeling is a guide that allows knowing the content of the products and choosing healthier foods to prevent diseases and overweight. See Figure 2.

Attitudes about NS

Parents and/or caregivers of the educational units mentioned consuming PF daily, the main reasons being the lack of time to prepare the food, the ease, the taste and to vary the diet and not having enough time to analyze the content of the food. front labeling of PFs as they generally shop in a rush, while other parents analyze NS.

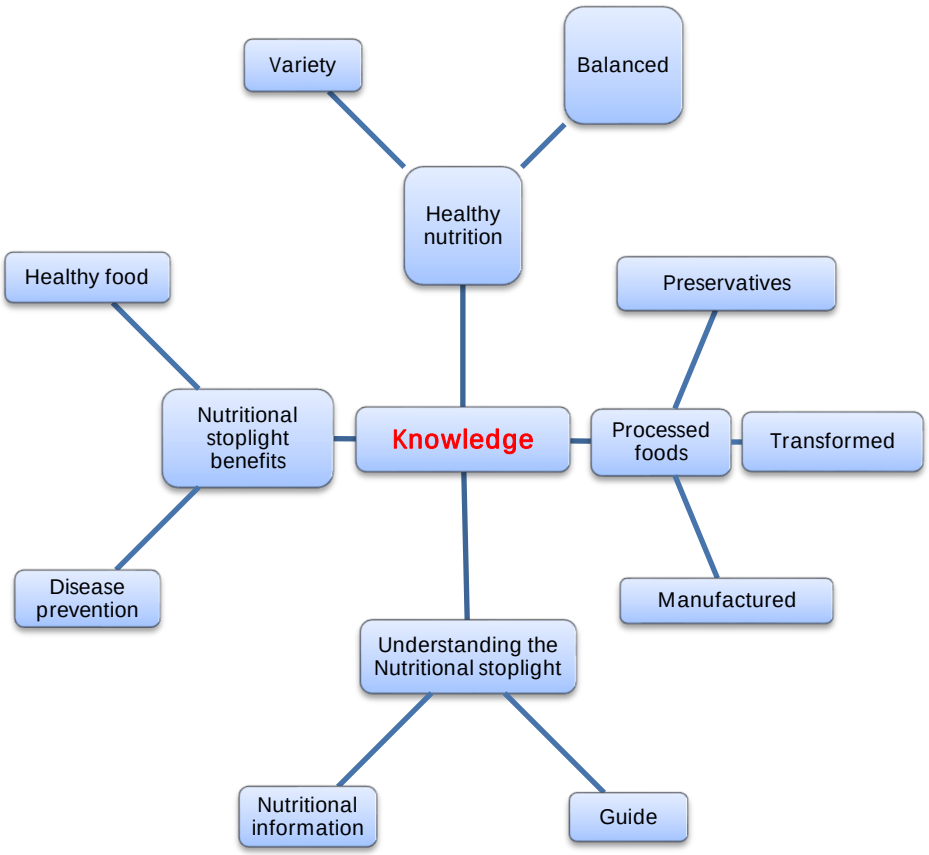

Fig. 2 Knowledge of parents and / or caregivers about the nutritional traffic light and processed foods

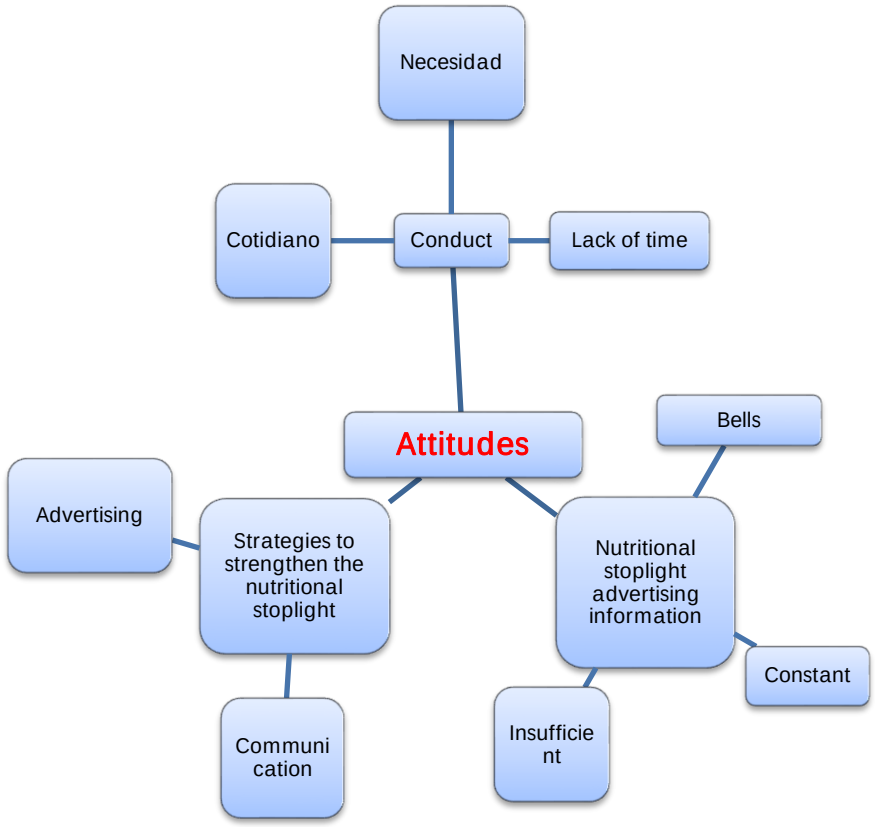

Fig. 3 Attitude of parents and / or caregivers towards the nutritional traffic light and processed foods

Table 7 Relationship between demographic, socioeconomic and advertising characteristics and the practice of NS

	Use the stoplight Yes n=182	No n=193	OR	CI95%	P
LOII	122 (67.03%)	123 (63.73%)	0.43	0.29-0.63	<0.001

LOI: Level of Instruction (Low vs Secondary or higher)

They stated that the advertising information used to spread the NS was not sufficient or permanent. While a mother from the Nueva Aurora educational unit learned during the interview about the existence of PF labeling and that to promote the use of NS, the dissemination of information through the media with advertisements, campaigns and educational talks would raise awareness among the population. See Figure 3.

Nutrition Labeling Practices

In the two educational units, the parents and caregivers stated that the family member who generally makes the food selection is the mother because she is in charge of preparing the meals and knows the family's food preferences; participation of parents and children is rare. The incentives to increase the consumption of PF were promotions, offers, prices and prizes (toys), which are more frequently directed at children, as they are the most susceptible age group.

The parents and/or caregivers of the Fiscal-EU stated that economic resources are an important factor for the selection of food because, although they would like to buy more products, they carry out this activity according to the money they have, in contrast to the Private-EU, where this factor did not have the same relevance.

In the public educational unit, they mentioned modifying their home or traditional diet by PF due to the lack of time to prepare homemade food and the taste, a situation that occurs in a similar way in the private educational unit. Most of them pointed out that they did not use PF labeling and looked at other factors, such as taste, costs and expiration date. They also mentioned that the traffic light had not changed their buying habits, while in the particular educational unit, the participants used NS more frequently before choosing a product.

The parents of the two educational units that use the NS do so because they have a health condition or to prevent diseases for both themselves and their family. Most of them mentioned that the main problems for the use of NS are the lack of information on food labeling and the consequences of excessive consumption of processed products. They also stated that the main measure to promote the use of the traffic

Fig. 4 Nutrition Labeling Practices

light is the realization of permanent advertising campaigns by the different communication media aimed at the entire population and in schools at children because they are spokespersons for their parents. See figure 4.

Discussion

In both educational units, the sociodemographic characteristics were similar; however, when taking into account aspects such as occupation, level of education and monthly income, it was revealed that there were differences between parents in the public and private units. The former had a lower educational level, lower average monthly income and a lower proportion of formal employment than parents and caregivers in the private educational unit. Age and educational level were associated with understanding nutrition labeling and with attitudes when selecting foods.

This information was corroborated in the analysis of the focus groups, in which it was shown that parents who were younger, with a medium to high educational level, seemed to have more knowledge about the importance of the proper selection of foods, the impact the consumption of processed foods in health and in the interpretation of nutritional labels; This could be explained because it is a relatively recent issue in Ecuador, it began to be used in 2013 [9, 10], therefore it is possible that before this date, actions to promote healthy eating habits will be scarce in the country.

Another finding was that the responsibility for the selection and preparation of food generally fell on the mothers, with little participation from the fathers; which shows the female role in the selection of food at home; Although this should be a family concern, since the health and nutritional habits of all members of the family unit depend on it. [11]. Currently, most women work outside the home, which makes them prioritize food options that require little preparation time and are inexpensive at the same time since, in many cases, these women are also single mothers and are those in charge of managing the household economy.

These results agree with those of Ingaroca and León [12]. In rural Peruvian households, they observed that women develop traditional roles, including the selection and preparation of the food consumed by the family, as well as education and childcare, while men have a more important role in the search for economic resources and in working outside the home.

Additionally, the results obtained agree with those of Machín et al., [13], who found that mothers with a low socioeconomic level and with a primary education level considered nutritional labeling difficult to understand and, furthermore, had the belief that "healthy" products had a higher cost; thus, they did not pay too much attention to nutritional labeling when choosing foods for their children's diet.

In a study carried out by Freire, Waters and Rivas [5] in Ecuador, it was shown that NS, together with access to quality nutritional information and a medium to high socioeconomic level, were the factors that most influenced food selection in supermarkets. These results coincide with those obtained in this study, in which parents and caregivers with higher monthly income showed a better understanding of NS and showed a better attitude towards it in the selection of food.

According to the information obtained in the focus groups and in the survey, it was evidenced that the degree of understanding of the parents about food labeling (NS) was acceptable; however, they affirmed that they consumed PF and did not pay too much attention to the labeling of the food. time to select foods. The explanation they gave to this was that they gave more importance to the customs of the family, the taste of the product and its price than to its nutritional composition. This indicates that it is necessary to strengthen nutritional education from childhood, promoting the responsible consumption of food, as part of the culture of Ecuadorian society.

Despite the fact that during the development of this work an acceptable level of understanding of NS was reflected, it could be noted that at the time of food selection, this does not seem to be enough for them to make a healthier choice or to reduce the consumption of products processed; which shows that the selection of foods is a multifactorial process, in which it is not only necessary to know the nutritional specifications of the food, but other factors intervene, such as the time available to prepare them, family or social customs, the cost of the product, among others.

Sobal and Bisogni [14] obtained similar results, stating that the food selection process depends on several factors, such as the moment of the life cycle

that each person goes through, their experiences, their family traditions, the purchasing power they have and the socioeconomic environment in which it develops. Therefore, a multidisciplinary approach in nutrition education is required to modify decisions when selecting foods, and it is not enough to offer information on the nutritional content of foods, as has been demonstrated in this work.

In a systematic review and meta-analysis by Yee, Lwin, and Ho [15], which included more than six thousand articles, determined that the availability of healthy food at home and the example of parents is the main factor in the development of healthy eating habits; additionally, access to PC and the lack of restrictions to access them by parents predispose parents to its use in adult life.

In this research, it was observed that one of the factors with the greatest influence on food selection was its cost. Despite understanding the NS indications, lower cost foods were preferred by most parents and caregivers. These results also agree with those of Blaine et al., [16] who argue that the cost of the products and the level of information that parents or caregivers have are very important factors at the time of food selection.

For Khamphuis et al., [17] Adults with greater access to general education and better purchasing power showed a tendency to eat better by choosing natural, unprocessed and cheaper foods compared to other adults with a lower educational level. However, they mentioned that other factors also intervene in the decision to choose food, such as the presence of comorbidities, which also coincides with what was obtained in this research, in which several parents and caregivers expressed that they select their foods, according to the medical indications received, due to the presence of diseases such as hypertension, diabetes mellitus, hypothyroidism or obesity.

The participants in this research confirmed that food advertising is a factor that influences food selection and PF consumption in the population. These results agree with the findings of Díaz, Bacardí, Souto and Jiménez [18], who determined that advertising has a significant impact when selecting food since it is capable of modifying personal preferences and product demand. These researchers also demonstrated that people are influenced by advertising when selecting food, arguing that, if advertising for processed products predominates, their consumption increases and, on the contrary, if advertising is aimed at unprocessed foods This also increases the mass consumption of these products.

Television advertising turned out to be the main factor in food selection in this research; its effect reaches not only adults but also minors, who ask their parents to buy their products of choice. Advertising aimed at children uses subliminal information techniques, which arouses interest in the advertised product [18]. This shows the need to create nutritional habits from childhood, at home, and in this, parents, by example and restricting the consumption of PF, have a fundamental role [19].

On the other hand, in the analysis of the focus groups, the most recurrent justification for not using or complying with the NS was the lack of time to read it and, in some cases, little information about it. The truth is that the participants recognized that advertising about nutritional labeling was scarce in the country and that despite knowing it, they did not always use it due to lack of time or family preferences.

Study limitations

The sample analyzed was quite homogeneous, which implies that the results obtained should not be generalized to the entire Ecuadorian population. Another limitation was the low participation of men in the focus groups, and most opinions were based on the opinions of women.

Conclusions

Knowledge about nutritional labeling was high among parents and caregivers, and the majority affirmed understanding it and using it when making food selections in the supermarket; however, in practice, they continued to select PF. The factors that most influenced this selection process were preparation time, taste and cost, which shows the need to increase nutritional education to the entire Ecuadorian society, especially to women and young people who are in charge of selecting the foods that are consumed at home.

Abbreviations

PF: Processed foods. **NS**: Nutritional stoplight.

Supplementary information

Supplementary materials are not declared.

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Authors' contributions
Gabriela Cantuña: Conceptualization, Data Conservation, Fund Acquisition, Research, Resources, Software, Writing - original draft, Writing: review and editing.
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Patricia Ortiz: Methodology, Formal analysis, Project management, Supervision, Validation, Visualization.

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Declarations
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Not required for descriptive observational studies.

Publication consent
It does not apply to studies that do not publish MRI/CT/Rx images or physical examination photographs.

Conflicts of interest
The authors declare no conflicts of interest.

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